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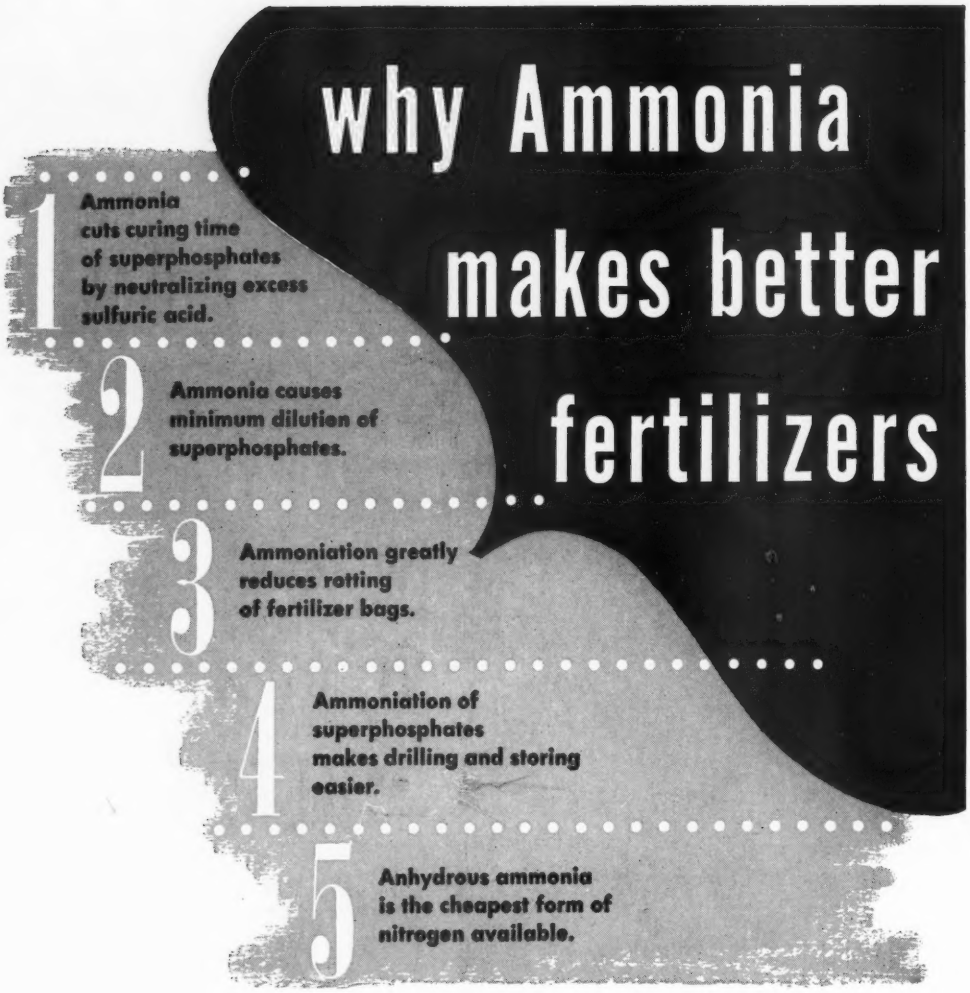

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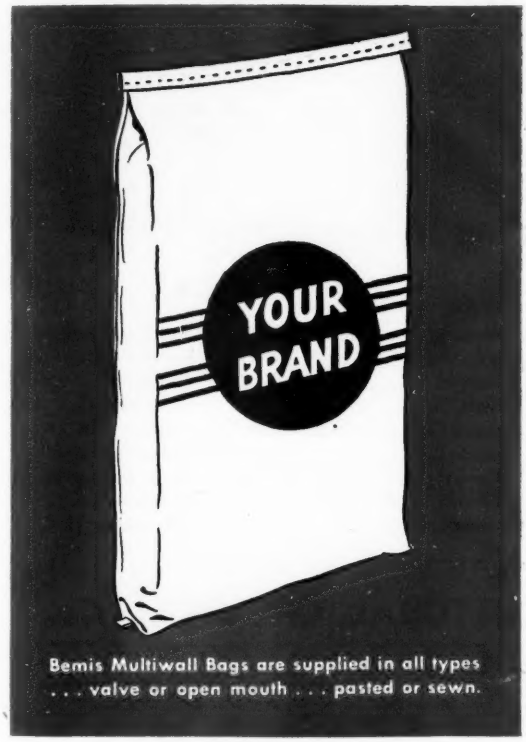

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The American FERTILIZER

Vol. 107 DECEMBER 13, 1947 No. 12

Control Problems in the Fertilizer Industry*

By S. F. THORTON

Director, Chemical Control and Farm Service Department, F. S. Royster Guano Company, Norfolk, Va.

Chemical control is a well established and necessary part in fertilizer production. It is the "eye" of the fertilizer factory. No factory can afford to be very far away from a control laboratory.

In the fertilizer factory, chemical control is concerned primarily with efficiency of production and control of quality. Meeting the requirements of State control laws is a necessary part of this work but by no means its basic purpose.

Effective production control means getting good samples from the factory and getting the analytical results back to the factory promptly. This is the real problem in chemical control work in the fertilizer industry and the end toward which all efforts are directed.

Specific problems are almost too numerous to mention and entirely too numerous to discuss in detail in the short time available today. Only a few of the problems that, at the moment, appeal to me as the more important ones can be considered.

Laboratory Facilities.—Promptness in reporting results is a primary requirement of good chemical control work. Each day and often each hour that results are delayed, decreases their value.

This requirement for speed is a dominant consideration in all plans for the control laboratory—its location, its equipment, its staff and its plan of operation. It makes for a physical plant and a plan of operation quite different from that found in the usual State control laboratory.

A good example of such differences is the common practice in the industry control laboratory of having each day's work complete in itself. Samples received in the morning are completed and reported out before the laboratory closes in the afternoon.

New Materials.—In recent years many new fertilizer materials have been added to the list of those in common use in the fertilizer factory. A few examples of such materials are ammonium nitrate, aqua and anhydrous ammonia. ammonia solutions, urea and concentrated superphosphate.

Many of these new materials are concentrated in nature, and are more or less unknown quantities in their chemical reactions and physical properties in fertilizer mixtures. Their use has greatly increased the need for thorough mixing and curing and has greatly added to the complexity of the problem of sampling and analysis.

Concentrated Mixtures.—Fertilizers now are largely mixtures of highly purified chemicals. Such mixtures require quite different handling in the factory and laboratory from that required by the 1–8–1 and 2–8–2 of earlier times. Mixing and sampling, especially, must be done with greatest care.

Segregation.—Present day fertilizer mix-

* A paper presented at the Annual Meeting of the Association of American Fertilizer Control Officials, Washington, D. C., October 21, 1947.

tures contain large quantities of concentrated chemicals of distinctly different physical properties. This is especially true when the mixture is such that no ordinary grade superphosphate, or only a small quantity ,has been used.

Even a casual examination of such mixtures will show that segregation is a serious problem. This is true whether we think of the pile in the factory, the bag on the farm, or the can or bottle in the laboratory.

Reversion.—Loss of available phosphoric acid through the process known as reversion has always been a serious problem in chemical control work. Present greatly increased use of ammonia, ammonia solutions, cyanamide, magnesium oxide, limestone and other alkaline materials in the fertilizer mixture has aggravated this problem. It is something that has to be watched every hour of every day.

Secondary and Minor Plant Nutrients.—When fertilizers were made largely from low-grade waste materials, the content of secondary and minor plant nutrient elements could safely be left to chance. Now we are fast arriving at the point where these must be added and controlled much like nitrogen, phosphoric acid and potash.

This means added work for the control laboratory and new problems, for often very small amounts of materials are involved and methods of analysis are not as dependable as we would like. Borax is an example that illustrates both these points.

State Control Laws.—There may be some who will be surprised that compliance with the provisions of State control laws is classed as a problem that worries the industry control laboratory but I doubt that any such will be found here. The fertilizer industry in the United States operates under the supervision of 47 separate and distinct State control laws. No two of these laws are exactly alike and seldom do we find any two close together even in their principal provisions.

Not only is there this lack of uniformity in the requirements of the various State laws, but there is also an equal lack of consistency in the details of law enforcement. And rules, regulations and enforcement procedures are as important as the law itself.

The sampling technique, for example, varies all of the way from the casual taking of a pint of fertilizer out of a few sacks by an inexperienced man paid a few dollars a week for a few weeks' work to the use of the Indiana sampler by an experienced man who is a full-time staff member, just as are the chemists or other technically trained men. In the same way, laboratory facilities range from the large, elaborately equipped and staffed institution handling 6,000 to 8,000 samples a year to the small place that receives only a few dozen samples each year and is staffed and equipped accordingly.

When it comes to tolerances, there is a variation from no allowance at all to 5 per cent of the total value of the goods. Penalties, likewise, vary from none at all to double the invoice value of the fertilizer for even minor deficiencies.

Complete uniformity between States is not practical and probably not even desirable. Greater uniformity than now exists, however, is both practical and desirable. It is a worthy goal and deserving of the best efforts of your Association.

Sampling and Analysis.—The words "sampling" and "analysis" just about cover the techniques in chemical control. For this reason they include a large share of the problems in this work.

In the early days of chemical control work, it appears that sampling was not a very troublesome problem. Almost any reasonable procedure seemed to give satisfactory results.

On the other hand, analytical procedure was the big problem. Methods used in different laboratories often varied widely and many methods had not attained a satisfactory degree of perfection.

Results from different laboratories frequently failed to check, even for the more common determinations like nitrogen, phosphoric acid and potash. This situation is presented in a dramatic, although greatly exaggerated, form on the cover of the *Sons Book of the A.O.A.C.* recently reproduced in the August 15, 1947, issue of the Association's *Journal*, and representing Connecticut, North Carolina and Indiana as having obtained nitrogen results of 8.47 per cent, 27.82 per cent and 0.31 per cent respectively, or an average of 12.20 per cent on a material with a theoretical nitrogen content of 12.20 per cent.

Today the situation is quite different. Work in the fertilizer laboratory is greatly improved. In our own organization, for example, we have several hundred occasions each year to check with other laboratories—between our own, with those operated by other units of the fertilizer industry, and with many State control laboratories. Cases of serious disagreement between results for nitrogen, phosphoric acid and potash are so rare as to be almost negligible in importance.

This highly favorable situation exists in

(Continued on page 26)

The Use of Anhydrous Ammonia as a Source of Nitrogen

By Dr. W. B. ANDREWS

Associate Agronomist, Agricultural Experiment Station, State College, Mississippi

OVER 200,000 acres of corn and cotton were fertilized with anhydrous ammonia during this year, 1947. Over 400 operators, all without prior experience, have applied anhydrous ammonia without serious difficulties. The experimental data and equipment recommendations were presented to farmers on March 7th, at which time no equipment was available and little ammonia was promised.

The use of anhydrous ammonia moved quickly into the delta of Arkansas and Louisiana, and it is now spreading into the hill sections of Mississippi. I understand that it is in the process of getting a start in Alabama, Florida, and some of the Middle Western States. The acreage which will be fertilized with anhydrous ammonia next year promises to run well into the millions.

The farmer's equipment for applying ammonia was made in local shops, and ammonia was supplied to all who asked for it. The shortage of solid sources of nitrogen, no doubt, was largely responsible for the immediate acceptance of anhydrous ammonia by a few enterprising farmers. The success of these farmers in handling anhydrous ammonia, no doubt, was responsible for about 400 farmers using it.

Cost of Equipment

The cost of the equipment required to apply ammonia is approximately as follows:

Tractor equipment.....$250 to $400
Trailer tank (1080 gallons).....$500 to $600

The tractor tank and the trailer tank may also be used for butane or propane where these are used in flame cultivation.

For details in construction of the equipment, the reader is referred to Mississippi Agricultural Experiment Station Bulletin 448 on Ammonia, 1947, or to a book, *Fertilizer and Manures* by the author of this paper.

Properties of Anhydrous Ammonia

Anhydrous ammonia is a gas which is compressed to a liquid for handling in commerce. Its pressure varies with temperature, and at 100° F. it has a pressure of 197 pounds per square inch.

When applied to the soil, ammonia combines with the clay and organic matter to form solids. It is necessary that ammonia be covered as it is applied to prevent its loss into the air. So long as nitrogen in the soil is in the ammonium form, it is not leachable.

W. B. Andrews

In fertile, well aerated soils ammonia is converted into nitrates within four to six weeks in warm weather. The rate of nitrification is slower in poor soils, wet soils, heavy soils, and during cold weather.

Factors Determining Use of Ammonia

The factors which will determine whether or not anhydrous ammonia will be used when other sources of nitrogen are available are (1) cost; (2) adaptation to machine application; (3) adaptability to application on a service basis; (4) ease of application at a uniform rate and at the desired depth; and (5) crop response.

* An address to the Fall Meeting of The National Fertilizer Association, Atlanta, Ga., November 12, 1947.

Relative Cost of Nitrogen

Anhydrous ammonia is the cheapest source of nitrogen available. The 1947 relative retail prices of nitrogen in Mississippi were:

Source	Cost Per Pound of Nitrogen
Nitrate of Soda	17 cents
Cyanamid	13 cents
Ammonium Nitrate	10 cents
Anhydrous Ammonia	6 cents

I have heard some comment that the retail price of nitrogen as anhydrous ammonia may advance to 7.3 cents per pound for next year.

The cost of anhydrous ammonia in the future will depend upon the length of the storage period, which will depend upon the demand for this product as well as upon seasonal use.

Adaptation to Machine Application

Anhydrous ammonia is transported in tanks mounted on trucks or trailers. A 1,080-gallon trailer which may be pulled behind a pick-up truck may contain 4,100 pounds of nitrogen, which is equivalent to 25,600 pounds of nitrate of soda.

Anhydrous ammonia has been applied in a single operation on bedded or flat land before planting and in sidedressing crops. It has also been applied in combination with listing land before planting. It is also adapted to application in the planting operation, and in the cultivation operation, with only a minor reduction in the acreage which may be covered.

The tanks mounted on medium and heavy tractors hold (up to) 100 gallons of ammonia, containing 410 pounds of nitrogen, which is equivalent to 2,560 pounds of nitrate of soda. With an application of 41 pounds of nitrogen per acre, this quantity of nitrogen is sufficient for 10 acres.

A four-row tractor with one operator may apply nitrogen as anhydrous ammonia to from 40 to 80 acres per day, depending upon the speed and length of day. The ammonia is covered when it is applied.

With the equipment available, two men with a tractor normally apply solid fertilizer to 20 to 25 acres per day; however, the acreage covered may reach 40 acres per day with some equipment which is in use. In most cases, solid fertilizers have to be covered in a separate operation.

Application on a Service Basis

A considerable acreage has been fertilized with anhydrous ammonia on a service basis this year. With a 40-pound rate of application, the service charge, in addition to the retail price of the nitrogen, has been $2.60 to $3.60 per acre, which includes hauling the ammonia. The total cost of the nitrogen applied has been 12½ to 15 cents per pound. The cost of the equipment involved is $2,000 to $2,500.

If a tractor covers 40 acres per day the income is $104 to $144 per day, which is probably much more than the trade will tolerate under competitive conditions. If ammonia were applied for the difference between the cost of nitrogen as ammonia and ammonium nitrate, the cost for application of 40 pounds per acre would be $1.60 per acre, or $64 for 40 acres. This appears to be a good income for the equipment involved.

Ease of Application at a Uniform Rate and at the Desired Depth

The uniformity of application is much greater than is usually obtained with solids. It is estimated that a careful operator may maintain the rate of application within a plus or minus five per cent during 95 per cent of the time without taking undue precautions. However, some uneven application has been obtained due to failure to remove trash from the orifices.

The depth of application is limited only by the height of the lift of the applicators. When applied with the applicators attached to the cultivator frames, a six-inch depth is the practical limit. With equipment with a higher lift, deeper application may be obtained.

Crop Response to Ammonia and Ammonium Nitrate

Preference of Young Plants for Ammonia. Young cotton and particularly young corn prefer ammonia to nitrate nitrogen. When these young plants have ammonia available, they grow more rapidly than when only nitrate nitrogen is the source of nitrogen. Rapid growth of young plants facilitates cultivation.

Due to nitrification of ammonia in the soil, it is necessary to apply ammonia at or close to planting time if the ammonium stimulation is to be obtained. From this standpoint the application of ammonia in the planting operation appears to be ideal. In addition, applying ammonia in the planting operation would save one trip over the land.

Older plants prefer nitrate nitrogen. If ammonia were applied at planting time, it would supply young plants with ammonia and older plants with nitrate nitrogen, which appears to be ideal.

(Continued on page 28)

The Fertilizer Industry Means Service*

By WELLER NOBLE

Chairman of the Board of Directors, The National Fertilizer Associaton

(Continued from the issue of November 29, 1947)

Service to New Areas

As I have stated, we are essentially a service industry, and it is obviously our duty, therefore, to develop new territories so that farmers in new areas may profit by the use of fertilizers.

In the United States there are over 6,000,000 farms of the size of 300 acres or less. If in 1946 the average sale amounted to 10 tons, fertilizers were applied on only 1,500,000 farms in that year. Even though the average sale amounted to but five tons, there is still left a vast field for new business.

Another way of expressing the same idea can be made as to total acres. In the United States over 800,000,000 acres are utilized for crops and pastures. If the average of 500 pounds of fertilizer per acre was applied to the land in 1946 (and this is a conservative figure), only 60,000,000 acres were fertilized in that year and it is likely that the figure would be nearer 50,000,000 acres.

It is evident, therefore, that an enormous acreage, which is a potential field for fertilizers, should be developed. Despite current shortages in some areas, producers should survey carefully the opportunities that present themselves, and prepare to be in a position to satisfy, as promptly and as fully as possible, the needs which are disclosed.

Of recent years considerable publicity and criticism has been directed toward our industry because of its inability to supply the entire demand for fertilizers, particularly in new areas. Statistics indicate that the fertilizer industry performed magnificently in its distribution of fertilizers in those States which, prior to the war, neither desired nor used a significant tonnage of fertilizers. Prior to 1940, plants were established in areas where the demand and usage warranted investments in fertilizer plants, and it was those areas, in reality, which supported the industry.

In 1940, according to official figures, 7,778,000 tons of commercially distributed fertilizers were used in the United States. Seventy six per cent of this quantity, or 5,893,000 tons, was used in 12 States. In 1946, a total of 14,530,000 tons of fertilizers was delivered to farmers in the United States by commercial producers, with but about 65.5 per cent, or 9,508,000 tons, being delivered to the 12 principal fertilizer-consuming States. In other words, the increase in deliveries to the 12 principal fertilizer-consuming States in 1946 amounted to 3,615,000 tons, or 61.3 per cent; whereas in other areas, the increase in deliveries in 1946 amounted to 3,137,000 tons, or 166.4 per cent. It is significant to note that the tonnage shipped to other than the 12 major fertilizer-consuming States in 1946, amounting to 5,022,000 tons, equals about 65 per cent of the total tonnage sold in the entire United States in 1940. It is apparent from these figures that the industry is doing a fine job in supplying fertilizer to areas where fertilizer use heretofore has been less extensive.

As mentioned previously, many new plants have been erected in new areas, or are in contemplation as soon as materials and equipment are available, and it is hoped that the demand will continue, so as to warrant such capital outlay by the industry.

Higher Analysis Fertilizers

Much progress has been made in recent years in the elimination of low analysis grades and substituting therefor medium to relatively high analyses. This progress has been more sectional, however, than universal. A. L. Mehring of the United States Department of Agriculture, in his report for the year ended June 30, 1946, outlined some interesting data. Seven grades, in the order outlined, accounted for 52 per cent of all mixed fertilizer consumed in the United States for the period mentioned.

These were: 2–12–6; 3–9–6; 3–12–6; 5–10–5; 5–10–6; 4–8–6; and 4–12–4. One grade (2–12–6) accounted for 13½ per cent of all mixed fertilizer sold in the United States

(Continued on page 24)

* An address to the Fall Meeting of The National Fertilizer Association, Atlanta, Ga., November 11, 1947.

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Crop Goals for 1948 Announced

National goals for 1948, calling on farmers for top production not greatly different from wartime totals, were announced on November 21st by Secretary of Agriculture Clinton P. Anderson. The goals seek a total of 356 million acres, of which 296 million are for cultivated crops and the balance for hay crops. This exceeds indicated actual acreages for 1947 by about 9 million acres and continues the high total sought through last year's goals.

With the exception of a few commodities for which the desirable 1948 output is still indefinite, the 1948 goals round out the production pattern recommended to farmers as a guide for next year.

Underlying the continuing high goals is a recognition of the world need for food and this country's own high domestic-consumption requirements. This is particularly evident in the goals for wheat, feed grains, rice, and dry beans. To prevent the waste of

1948 GOALS

Commodity	Planted Acres 1947	Suggested Goal 1948
	Thousands	
Crops		
Corn	86,424	92,120
Sorghums, excl. sirup	[1]1,729	16,000
Soybeans for beans[1]	10,698	10,800
Peanuts, alone	3,873	[2]2,359
Cotton, July 1	21,389	22,000
Tobacco[1]	1,914	[5]1,552
Sugarcane, excl. sirup[1]	320	[4]320
Sugar beets	966	[4]966
Potatoes, Irish	2,239	[5]2,352
Sweet potatoes	651	[3]651
Beans, Dry edible	1,887	2,184
Peas, Dry edible	564	507
Truck Crops:		
For processing	2,026	[3]2,004
Fresh market[1]	1,896	[3]1,866
Intertilled Crops	146,576	155,681
Oats[6]	42,689	43,670
Barley[6]	12,268	12,786
Wheat, all	77,059	[5]75,095
Flaxseed	4,312	4,300
Rice	1,636	1,636
Rye[1]	1,953	[5]2,458
Close-growing Crops	139,917	139,934
Tame hay, all	60,339	60,339
Total	346,832	355,954

[1] Harvested.
[2] Allotment.
[3] Goal to be developed at a later date. Figure used here is preliminary estimate.
[4] Sugar Act of 1948 is applicable. Figure used here is indicated 1947 acreage.
[5] Final goal, as announced.
[6] Includes acreage planted in fall for harvesting in ucceeding spring.

production facilities through output in excess of demand, however, some shifts from war crops are indicated, in line with changing needs.

"Today, more than ever, U. S. farm production is a key factor in world recovery," Secretary Anderson said. "But, if this Nation is to provide a good share of the food needed so desperately by hungry nations abroad, it will mean an inevitably heavy drain on our already-strained soil resources. The continued large acreages suggested for cultivated crops means a delay in working toward a better balance between soil-depleting and soil-conserving crops.

"Farmers must take all possible precautions to guard against irreparable damage to the land. In the years to come, this will mean an urgent need for greatly accelerated conservation."

If foremost importance, because of the worldwide demand, are the goals for feed grains—corn, oats, barley, and sorghums for grain. These goals include a 2727 margin to provide for some shift as between wheat and other grains, since unpredictable factors, such as weather, may prevent reaching the full wheat acreage goal.

The world situation in fats and oils is still such that maintenance of high production is recommended for soybeans and flaxseed.

Indian Rivalry Affects Burlap Market

The partition of the old Indian Government into the two states of India and Pakistan has had its repercussions which are felt in many industries, among which is that of the humble though useful burlap bag. Most of the raw jute is grown in Pakistan and is shipped to Calcutta where some of it is woven into burlap and the balance exported to mills in other countries, particularly to Dundee, Scotland.

In order to encourage the formation of a complete burlap industry in Pakistan, the government of that country has imposed an export tax of 27 rupees ($8.10) per bale on raw jute exported to Calcutta. This amounts to about 8½ per cent of the present market price and would add about 1 cent per pound to the price of burlap. The Indian Government is now threatening to add an additional tax on Pakistan jute exported through Calcutta. So far, efforts to reach a solution of the problem by the two governments has shown no signs of success.

The efforts of Pakistan to develop a jute processing industry and an export point at the port of Chittagong are stymied by the lack of foreign exchange to buy machinery and equipment, and this currency cannot be obtained until they can get a market for their present supplies of jute. Eventually a solution to the problem will be worked out, but in the meantime a shortage of burlap is being felt all over the world.

Another Fertilizer Bill Introduced

The latest fertilizer bill to be introduced in Congress is one by Representative John Jennings, Jr., of Tennessee. This bill (H. R. 4562) proposes to grant the Secretary of Agriculture extensive authority in connection with production of "phosphate, potash and nitrate fertilizers" and their distribution to farmers; to authorize and direct him to allocate raw materials for the manufacture of fertilizers; and to appropriate $100,000,000 (including administrative expenses) for payments or grants to farmers, conditioned upon the application of "phosphate, potash and nitrate fertilizers" to increase the production of food and feed crops.

The Secretary is authorized to use the plants already owned and controlled by the United States, and also "to acquire by lease other necessary plants and facilities and to contract with persons for the purpose of the manufacture and distribution of such fertilizing materials." The bill does not specify whether such "leases" are to be mandatory on the present owners of such plants.

The bill has been referred to the Committee on Agriculture but no hearings have as yet, been scheduled. The industry is prepared to oppose such a dictatorship as is proposed.

Imports of German Potash Reported

Recent arrivals of two cargoes of sulphate of potash from Germany have been reported in the daily press. Four thousand tons of this material were landed at Norfolk, Va., during the last week of November while another freighter brought 3,500 tons to Wilmington, N. C., the following week. A third cargo of 3,500 tons is said to be enroute to either Charleston or Savannah. The material is all consigned to Synthetic Nitrogen Products Company.

October Tag Sales

Reports of State control officials to The National Fertilizer Association indicate that fertilizer tax tag sales in 16 States during October amounted to 536,000 equivalent short tons. Although sales were 8 per cent below the 584,000 tons reported for last October, they were higher than for any other October on record.

Sales in the 11 Southern States, amounting to 415,000 equivalent short tons, were 21 per cent below a year ago, but 10 per cent above two years ago. Compared with last October, sales were lower for six States, with tonnage decreases ranging from 176 tons for Virginia to 49,000 tons for Georgia. The other five States reported increases, ranging from 2,000 tons for Arkansas to 18,000 for South Carolina. Sales in the five Midwestern States, equivalent to 121,000 short tons, were 93 per cent above the 63,000 tons reported for a year ago and more than twice as great as the amount reported for October, 1945. Compared with last October, sales increased for Illinois, Indiana and Kentucky, with greatest tonnage increases in the order in which the States were listed; sales in Missouri were 9,000 tons below last year and sales in Kansas were 4,000 tons lower.

January—October Sales

January–October tag sales were equivalent to 7,648,000 short tons, a decrease of 2 per cent from last year, but were higher than for any other January–October period.

FERTILIZER TAX TAG SALES

COMPILED BY THE NATIONAL FERTILIZER ASSOCIATION

STATE	OCTOBER			JANUARY–OCTOBER			
	1947 Tons	1946 Tons	1945 Tons	% of 1946	1947 Tons	1946 Tons	1945 Tons
Virginia	48,766	48,942	32,466	99	590,320	596,220	531,716
North Carolina	97,115	88,321	60,906	98	1,347,834	1,370,372	1,268,756
South Carolina	75,200	56,985	33,280	98	762,689	781,020	725,260
Georgia	23,042	71,970	59,854	95	964,861	1,018,159	989,702
Florida	97,736	130,056	125,542	79	673,033	854,288	716,470
Alabama	10,800	33,500	16,400	81	622,300	766,050	665,500
Tennessee	8,027	26,940	19,975	101	307,098	304,634	267,202
Arkansas	6,411	4,500	3,200	103	146,279	141,550	113,400
Louisiana	10,760	32,300	6,024	87	202,703	232,718	213,510
Texas	30,703	26,251	16 940	111	347,748	314,083	191,855
Oklahoma	6,000	1,960	2,950	146	74,432	50,936	22,312
Total South	414,560	521,725	377,537	94	6,039,297	6,430,030	5,705,683
Indiana	43,635	19,875	26,566	116	591,640	511,617	408,606
Illinois	40,250	8,050	11,750	124	341,125	274,603	218,514
Kentucky	28,675	13,650	14,905	121	352,395	291,641	262,146
Missouri	5,575	14,219	1,388	87	219,736	251,978	146,634
Kansas	3,040	6,875	2,310	177	104,058	58,863	36,615
Total Midwest	121,175	62,669	56,919	116	1,608,954	1,388,702	1,072,515
Grand Total	535,735	584,394	434,456	98	7,648,251	7,818,732	6,778,19 6

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FERTILIZER MATERIALS MARKET

NEW YORK

No Slackening in Demand for Fertilizer Materials. Producers Sold up to Capacity. More Activity in Feed Material Market. Imports of German Potash Reported. Shortage of Ammonium Nitrate Caused by Export Requirements

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, December 10, 1947.

The demand for fertilizer materials has shown no sign of abating. Any increases in production of materials which may come about by increased plant facilities, will be covered by existing orders already on file in producer's sales offices. Consequently no spot market can be looked for in the near future.

Organic Materials

The organic fertilizer materials market was fairly stable in price, although prices of various vegetable meals fluctuated up and down. In some quarters it is believed there is a certain amount of speculation going on in some of these markets by outsiders. Vegetable meals for quick shipment were rather hard to find and prices were firm. Future positions could be bought at some discount. The demand for animal by-products increased from the feed trade with the advent of colder weather, particularly in the Mid-west. Tankage and blood were well bought at about $9.75 to $10.00 per unit of ammonia ($11.85 to $12.15 per unit N) Hoofmeal was in demand at $8.50 ($10.33 per unit N) f.o.b. shipping points. Soybean meal for quick shipment sold at from $88.00 to $90.00 per ton, f.o.b. Decatur, Ill., while cottonseed meal was quoted at around $96.00 per ton, f.o.b. Memphis.

There were several large inquiries in the market for garbage tankage, but as practically all producers are sold ahead on contract these orders went unfilled.

Fish Scrap

The season is entirely over for fishing in the North and reports from North Carolina so far indicate a poor catch due to unfavorable weather conditions. Last sales of fishmeal for feed made at about $165.00 per ton.

Castor Pomace

Producers were busy filling previous contracts with a good demand noted from several sections.

Potash

It is reported that about 12,000 tons of German sulphate of potash will arrive shortly at middle Atlantic Coast ports but it is understood the material has previously been sold. This material is badly needed. Domestic producers report the boxcar situation has improved somewhat and they are making shipments as fast as their facilities will permit.

Superphosphate

Reports were current that the supply situation has improved somewhat in the Southeast. There is a heavy export demand for triple superphosphate, with only a negligible amount said to be available.

Sulphate of Ammonia

While domestic producers are shipping the material out as fast as produced, the demand still exceeds the available supply. China was taken a considerable amount for export.

Ammonium Nitrate

Domestic buyers are finding it hard to fill their requirements of this material due to the export demand. Some manufacturers have been directed by the Government to turn over a good part of their production to the export trade.

Nitrate of Soda

Shipments from Chile are said to be arriving on schedule but the producers are allocating their material to old customers.

Bone Meal

As the fertilizer season draws nearer, the demand for both steamed and raw bonemeal

has increased and raw bone meal is particularly difficult to obtain. Some producers are sold ahead.

Nitrogenous Tankage

With numerous inquiries in the market, no material was reported available as producers are sold ahead on contract to regular customers.

PHILADELPHIA

Better Movement of Raw Materials Due to Improved Car Supply. Increase in Sulphate of Ammonia Prices Expected

Exclusive Correspondence to "The American Fertilizer"

PHILADELPHIA, December 8, 1947.

While shipments on contracts have been moving fairly well due to improved car supply, the demand for raw materials still continues from practically all sections. Renewed demand from the feeding trade has added strength to the blood and tankage market. It is reported that a bill has just been introduced in Congress, which if it becomes law will place the fertilizer industry under virtual dictatorship.

Sulphate of Ammonia.—This continues in short supply, and prices rule high for the material that happens to be available for spot delivery. It has been suggested that a general increase in price at producing plants may be expected at the turn of the year, but this is by no means a certainty.

Nitrate of Soda.—While imports are arriving on schedule, the demand continues ahead of supply, and there is ready outlet for any available material.

Nitrate of Ammonia.—Demand exceeds supply and production is sold well ahead.

Castor Pomace.—There is no free market, the production being sold on contract for months ahead.

Blood, Tankage, Bone.—Prices are higher due to renewed demand from the feeding trade. Blood was quoted at $10.00 per unit of ammonia ($12.15 per unit N), and tankage tankage sold as high at $10.50 ($12.76 per unit N). Steamed bone was offered at $45.00 to $50.00, but raw bone is practically off the market.

Fish Scrap.—No offerings of scrap are in evidence, but meal in limited amount was quoted at $155.00 to $165.00 per ton.

Phosphate Rock.—Car supply position has improved and the demand continues sufficiently strong to keep up with production.

Superphosphate.—Market is still in rather tight position, although an easier tendency is reported in some areas. Production is said to be well above last year.

Potash.—Domestic shipments are increasing, due to improved car supply. A lot of sulphate of potash is reported just unloaded at a southern port, and another similar lot is said to be leaving Europe this week. The source is said to be the American zone in Germany.

CHARLESTON

Mixed Goods Shipments to Date Less Than Last Year. Boxcar Scarcity Shows Improvement.

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, December 6, 1947.

All fertilizer materials remain short of demand. Movement of mixed goods to the country as indicated by tag sales is generally less than for the same period last year, but some states, such as South Carolina, Arkansas and the midwestern states, are ahead on shipments.

Organics.—Interest in organics is mainly from the feed trade with very little interest being shown by fertilizer manufacturers. South American organics are still too high for domestic fertilizer manufacturers' ideas of price. Domestic nitrogenous continues at $6.50 per unit of ammonia ($7.90 per

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unit N) in bulk, f.o.b. midwestern production point.

Castor Pomace.—No change has been indicated in the market recently and supplies are mainly moving against existing contracts. No new prices have been reported.

Potash.—Shipments against contracts are approximately two months behind, but improvement in the box car situation late in November allowed better distribution in the last two weeks. Prices are firm and unchanged. There are no further reports of additional quantities of imported potash.

Nitrate of Soda.—Importations are on schedule, but demand still is ahead of supply and the market continues tight. No change in price has been announced.

Sulphate of Ammonia.—The market is strong with demand in excess of output. Stocks are low and prices firm.

Dried Ground Blood.—Interest on the part of the feed market has increased the price in the west to $10.00 per unit of ammonia ($12.15 per unit N) in bulk, f.o.b. Chicago. New York material is selling at around $9.75 ($11.85 per unit N) in bulk.

Tankage.—Feeding interest has also increased the price on tankage to $10.50 per unit of ammonia ($12.76 per unit N) in New York and in the Chicago area. Offering are light.

Superphosphate.—September production of superphosphate amounted to approximately 809,000 tons of 18 per cent material. This production was 12 per cent above that reported for the same period last year. In spite of increased production, the market is tight and supplies extremely scarce.

Phosphate Rock.—Current demand maintains the market in a tight position. Movement improved slightly in recent weeks because of a better allocation of boxcars. Practically no stocks can be accumulated on account of demand.

CHICAGO

Bartering in Fertilizer Materials Re-appears but With Little Success. Feed Material Demand Good

Exclusive Correspondence to "The American Fertilizer"

CHICAGO, December 6, 1947

The scarcity of organic materials has again been demonstrated by the reappearance in the market of bartering propositions. The proposed exchanges, however, are invariably for materials which are difficult to obtain. Some fertilizer steamed bone meal has been offered but prices seemingly are too high.

In the feed market there still is a good

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demand for wet rendered tankage and blood, and considerable improved buying interest.

Fertilizer Purchases In Foreign Interim Aid Bill

In the so-called "stop-gap" bill for aid to France, Italy and Austria now being debated in Congress, $27,000,000 is alloted for the purchase of fertilizers. According to Senator Arthur Vandenberg, one of the sponsors of the bill, $17,000,000 of the above amount will be spent abroad for European-produced fertilizer materials. Fertilizers to the value of $1,000,000 for Austria, will be purchased abroad. France will receive $9,000,000 in fertilizers of which $6,000 will be spent abroad. Italy will receive $17,000,000 of which $10,000,000 will be foreign purchases. It is understood that the remaining $10,000,000 available for France and Italy will be used to take up their IEFC allotment of nitrogen from this country which they have been unable to do because of their lack of dollar exchange.

Commercial Solvents Advances Walker and Perry

At the November meeting of the Board of Directors of Commercial Solvents Corporation. Major Theodore P. Walker was appointed chairman of the Board. Henry E. Perry, formerly executive vice-president, was elected president of the Corporation to fill the position left vacant by Major Walker's elevation to the chairmanship .Major Walker will continue active participation in the management of the Corporation.

V-C Starts Company Publication

The Virginia-Carolina Chemical Corporation has started the publication of a very attractive house-organ *V-C News* which is edited by and for the employees of that company. The editorial staff includes Alfred J. Dickinson, editor; R. Clifton Long, managing editor; Richard H. Decker, business manager; Curtis B. Alderman and Katharyne Hechler, associate editors; W. Carter Childress, Edna Duncan, Jean Tiller, D. Harold Johnson, Hazel Laird, Geraldine Smith, Frances Thrasher, assistant editors; J. Frasia Butler, circulation manager.

Included in the current November issue is an interesting article on the new V-C phosphate rock development in Florida, a second installment on the early history of the company, and several pages of news items regarding members of the V-C staff in the various factories and divisions. Well printed in three colors and profusely illustrated, the *V-C News* should be an effective means of cementing the relationship and cooperation of the great V-C organization.

Gunn Appointed Chilean Nitrate Atlanta Manager

The Chilean Nitrate Sales Corporation has announced the appointment of Watts Gunn as District Manager of the Atlanta office, succeeding the late W. E. Matthews.

Mr. Gunn joined the Chilean organization in 1938 as sales representative in Florida. Later he assumed direct supervision of the company's port and warehouse operations, from which post he takes over his new duties as manager for Georgia and Florida.

New Bradley Pulverizer Booklet

The Bradley Pulverizer Co., Allentown, Pa., has issued an attractive 24-page booklet, *Catalog No. 59*, describing the new Type H Bradley Hercules Mill which is now in production for delivery in 1948. The new mill incorporates a number of improvements developed during the past years and is temed by the company as the most rugged, compact and accessible pulverizer designed during their 55 years of manufacture.

The hourly capacity of the Type H mill is given as 25 tons of phosphate rock, 20 tons of phosphate rock clinker and 30 to 40 tons of agricultural limestone. In grinding phosphate rock, 90 to 95 per cent passes a 60-mesh sieve, up to 80 per cent a 100-mesh, and up to 60 per cent passing 200-mesh. Copies of the booklet can be obtained by writing the office of the company.

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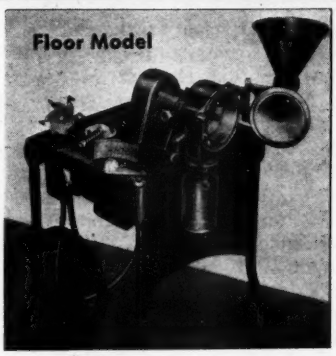

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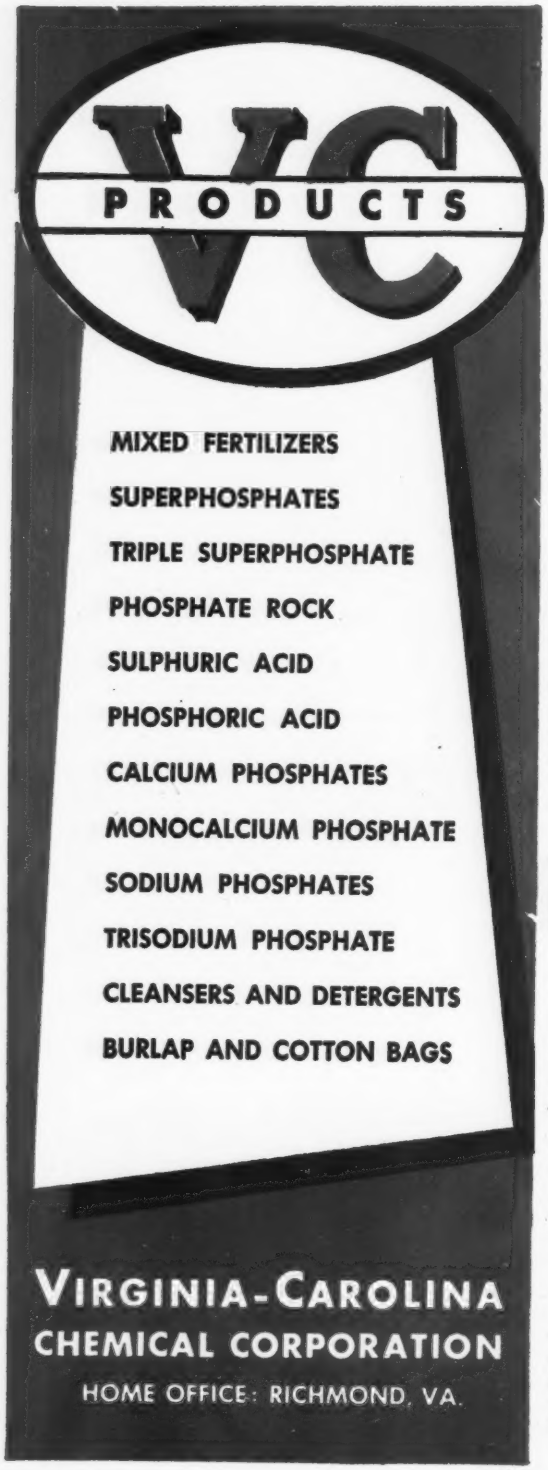

Liquid Phosphoric Acid

The increasing use of anhydrous ammonia and ammonia liquor for direct application to the soil has resulted in experiments on the application of liquid phosphoric acid in the same way, according to a report by W. H. MacIntire, head of the Department of Chemistry, University of Tennessee Agricultural Experiment Station, and his associates, which is published in the November issue of the *Journal of the American Society of Agronomy*.

Pot tests were made on rye grass and red clover, with comparison being made between phosphoric acid and concentrated superphosphate. The results showed increases in growth in about the same proportion, with the phosphoric acid showing no adverse effect on germination.

International Paper Forms Bagpak Division

John H. Hinman, President of International Paper Company, has announced the formation of the Company's Bagpak Division, to carry on all its operations involving manufacture and sale of heavy-duty multi-wall kraft paper bags. Previously these operations were handled by two subsidiary companies, George and Sherrard Paper Company and Bagpak, Inc., which have been dissolved, and by the Company's former International Paper Products Division.

Obituary

William E. Matthews, Jr.

The National Fertilizer Association Convention in Atlanta was saddened by the sudden death on November 10th of William E. Matthews, Georgia District Manager of the Chilean Nitrate Sales Corporation. Mr. Matthews, who was 69 years of age, spent his entire business career as a salesman of Chilean nitrate. Joining the Anglo-Chilean Nitrate Co. staff in 1927, he was appointed to the head of the Georgia district when that company merged with the Chilean Nitrate Sales Corporation in 1931. Bill Matthews had a host of friends in the fertilizer industry, many of whom attended his funeral services on November 11th. At the opening session of the N. F. A. Convention, his death was announced by chairman Noble and the convention stood in silence in memory of a beloved associate.

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			WATER %	NITRATE %	AMMONIA %	TOTAL
NITROGEN SOLUTION...1	65.0	21.7	13.3	11.38	29.22	40.6
NITROGEN SOLUTION...2	55.5	26.0	18.5	9.71	31.10	40.8
NITROGEN SOLUTION...3	66.8	16.6	16.6	11.69	25.34	37.0

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October Sulphate of Ammonia

The figures of the U. S. Bureau of Mines show that 73,741 tons of by-product sulphate of ammonia were produced in October, an increase of almost 8 per cent over September production of 68,340 tons. Shipments were 69,153 tons, somewhat less than production, due to shortage of transportation facilities which has hampered all fertilizer shipments for some months. Stocks on hand at producings plants on October 31st were 31,104 tons, which is less than two weeks' production.

Since the first of the year, the output of by-product sulphate of ammonia is $674,084 tons, an increase of 28 per cent over the same portion of 1946. This was due principally to absence of strikes in the steel and coal industries during the present year.

	Sulphate of Ammonia Tons	Ammonia Liquor Tons NH
Production		
October, 1947	73,741	2,188
September, 1947	68,340	2,072
October, 1946	66,662	2,318
Jan.-Oct., 1947	674,084	21,398
Jan.-Oct., 1946	527,343	20,340
Shipments		
October, 1947	69,153	1,916
September, 1947	66,548	1,892
October, 1946	62,018	2,402
Stocks on Hand		
Oct. 31, 1947	31,104	757
Sept., 30, 1947	26,878	633
Oct. 31, 1946	45,616	685

THE FERTILIZER INDUSTRY MEANS SERVICE

(Continued from page 11)

in 1946. Two items appear to be pertinent, the first, these seven grades (equal to about two per cent of the total number of grades sold) account for 52 per cent of the mixed fertilizer consumed in the United States; and secondly, these grades are not particularly high-analysis fertilizers.

A frequently advanced reason for low-analysis grades is farmer demand. The farmer naturally wants a fertilizer that will be most economical and most efficient for him to use, just as he wants the most efficient farm equipment and the best automobile. So, without discounting the importance of his past of present preferences as they may affect fertilizer grades, the industry, through vigorous and persistent educational work, can show him the benefits that will accrue to him through the use of higher analysis grades, and thus create a demand that will make a substantial and constructive contribution to the solution of one of industry's problems. This would, if consummated, eliminate much criticism and, what is more important, would render a greater service to our ultimate consumer, the farmer. It is well to repeat that many areas and many companies have currently adopted this program, but incidentally, the criticism directed to industry because of the few exceptions, may be more vocal and more potent than the credit given for the progressive program of the majority. In making these remarks, I am not unmindful of the manufacturing problems that may be met in some instances, now and in the immediate future, through shortage of some fertilizer materials.

Business Ethics

In concluding my discussion of the industry's obligation and service to agriculture, I desire to briefly state what, to me at least, is our most important obligation—that of continuing to conduct our business on a moral standard of the highest order.

If our industry follows the cycles of past years, in the not too distant future we will emerge from the era of scarcity to the era of surpluses. This will produce many serious problems, all of which can be solved if our industry continues to operate on the high ethical basis it has followed in making fair distribution of its products when supply has not met demand. Concretely, my remarks on this subject are summed up in what is known as "The Four-Way Test" which has been printed and widely circulated by Rotary International throughout the world. This is a pattern for the standard, which if followed, will successfully solve, in my judgment, any problem that may arise in the current or future operations of our industry.

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The Sturtevant Den and Excavator unit provides a complete method for producing superior, bulky yet granular superphosphate for use as fertilizer . . . quickly and economically. Easily operated by two men, the unit will produce 30 to 40 tons per batch and up to 480 tons per day.

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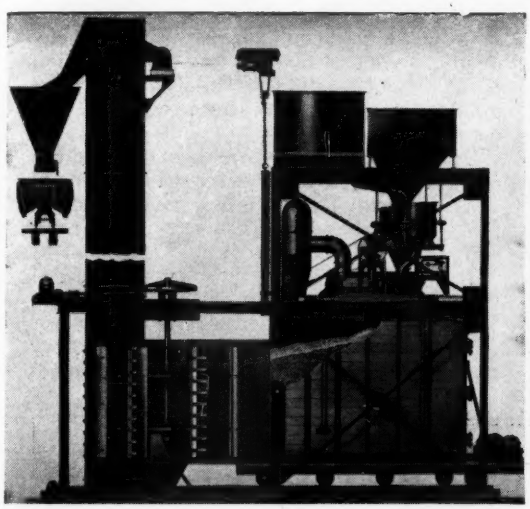
Sturtevant Den and Excavator units are rugged and require little if any maintenance. They produce a superior fertilizer free from lumps. Write for complete details and specifications.



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"The Four-Way Test:
(1) Is it the truth?
(2) Is it fair to all concerned?
(3) Will it build good-will for the business or profession and better friendships for our people?
(4) Will it be profitable to all concerned?"

It is well to repeat my firm conviction that present and future problems will be resolved with credit to our industry if the principles enunciated in Rotary's "Four-Way Test" are followed.

T. N. Barksdale Joins Bemis Memphis Sales Division

T. N. Barksdale, until recently in charge of Bemis Bro. Bag Company's Baltimore Sales Office, has assumed new sales responsibilities at the Bemis Sales Division. This office covers all of Tennessee and Mississippi and portions of five other states. Mr. Barksdale has been with Bemis Bro. Bag Co. for twenty-two years. Last May he was elected vice-president of the Norfolk Chapter Bemis 20-Year Club—a veteran company employee group which now has over a thousand members.

Siems Urges More Detailed Plant Plant Growth Experiments

The need for determining all of the factors and conditions that have to do with the maximum yield of the most important crops in each State was stressed by Dr. H. B. Siems, Chairman of the National Fertilizer Association's Plant Food Research Committee at the recent dinner given by the Committee in Cincinnati. Dr. Siems pointed out that this was desirable, even though creation of certain conditions may at first not appear profitable.

After it has been determined what the optimum conditions are for maximum yield, quality considered, the practical agronomist and farmer can decide what is practicable and profitable, Dr. Siems remarked. Studies of this kind, he said, have been conducted in recent years on corn in the Corn Belt and in Southeastern States and have yielded information of great benefit to American agriculture. There is good reason to believe that similar studies on the other important agricultural crops will yield extremely valuable information. Factors such as suitable varieties, amounts, analysis, plant nutrient placement, moisture relations, plant population, light intensity, etc., should be studied. It is only after we know what each factor contributes to yield and quality that we can determine whether the cost of controlling such factors is within practical limits.

If this country should some day face a very serious national emergency and possibly be drawn into a world conflict, information of this type would be of great value, Dr. Siems concluded.

CONTROL PROBLEMS IN THE FERTILIZER INDUSTRY

(Continued from page 8)

spite of the fact that satisfactory methods for some of the less common plant nutrient elements are not available. In this connection boron is outstanding. We also need more reliable methods for nitrate nitrogen and moisture.

Sampling now is the trouble maker and the problem that gets my vote for the number one position on any list. It is deserving not of the few minutes that can now be devoted to it but rather of a full day's program.

In saying this, I have in mind the work of both the fertilizer industry and the State inspection service. There seems little doubt that a high percentage of the unsatisfactory analyses reported today are due to samples

PULVERIZED MASCOT LIMESTONE
Trade Mark Registered

MAGNESIUM LIMESTONE
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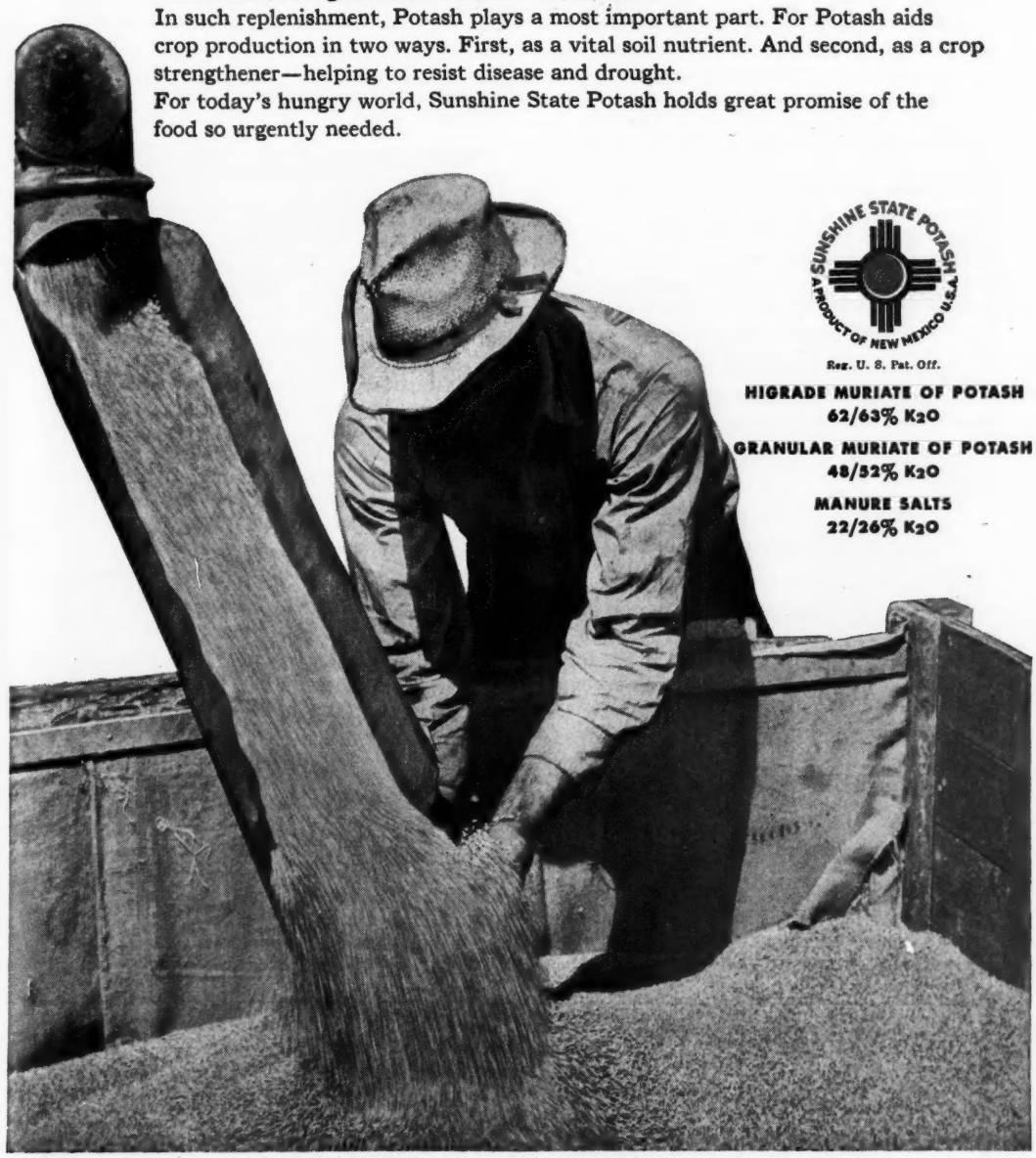
Replenishment of the soil through the sound and adequate use of the correct type of fertilizer is more than ever essential if America is to be called upon for an ever increasing share of the world's food-stuffs.

In such replenishment, Potash plays a most important part. For Potash aids crop production in two ways. First, as a vital soil nutrient. And second, as a crop strengthener—helping to resist disease and drought.

For today's hungry world, Sunshine State Potash holds great promise of the food so urgently needed.



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that are not truly representative of the fertilizer from which they are taken. There are too many cases with no other logical explanation and too many cases where a second sample has given entirely different results, to believe otherwise.

Satisfactory chemical control in the factory and efficient and fair administration of State control laws, alike, are dependent upon effective work by men who take and prepare the samples. These are difficult jobs with present day fertilizers and deserving of intense study by the best talent that can be assigned to the problem.

And while these studies are in progress, our own experiences have shown that the situation can be greatly improved by a more diligent application of the things we already know—by honestly admitting that there is a serious sampling problem, by discarding the idea that sampling is a job anyone can do, by keeping the sampling job out of the hands of inexperienced operators unless they are under strict supervision, by not giving the sampler more work than he can properly handle, by giving as much attention to the preparation of samples as to the taking, by remembering that a poor sample is worse than no sample at all, and by willingness to do whatever is necessary to keep the sampling job in capable hands.

THE USE OF ANHYDROUS AMMONIA

(Contined from page 10)

Response of Corn and Cotton to Ammonia and Ammonium Nitrate on Wet Years. The data reported for corn and cotton are for 32 pounds of nitrogen from anhydrous ammonia and ammonium nitrate. In 12 tests with cotton where ammonia was compared to ammonium nitrate on two wet years the following data were obtained:

Source of Nitrogen	Depth of Application	Increase in Yield Lb. Seed Cotton Per Acre
Ammonium Nitrate....	4 in.	305
Anhydrous Ammonia...	4 in.	386
Anhydrous Ammonia...	6 in.	424

Statistically the increase for ammonia over ammonium nitrate at the 4-inch depth of application is significant; however, in seven other tests of a different layout where the variations were quite high, ammonia was inferior to ammonium nitrate, with the difference not being significant.

The reason for the superiority of ammonia in the above tests is not known unless it is associated with differences in leaching and with preference of young cotton for ammonia.

The 6-inch depth of application of ammonia was slightly superior to the 4-inch depth of application.

When nitrogen was applied as a sidedressing in the 12 tests the following data were obtained:

Source of Nitrogen	Depth of Application	Increase in Yield Lb. Seed Cotton Per Acre
Anhydrous Ammonia...	4 in.	330
Ammonium Nitrate....	4 in.	350
Ammonium Nitrate....	Surface	348

For sidedressing on two wet years, anhydrous ammonia and ammonium nitrate made practically the same increase in yield of seed cotton. Surface application of ammonium nitrate was just as effective on those wet years as a 4-inch depth of application, which contrasts sharply with the data for dry years reported below.

In 13 tests with corn where ammonia was compared to ammonium nitrate at the rate of 32 pounds of nitrogen per acre on two wet years, the following data were obtained:

Source of Nitrogen	Depth of Application	Increase in Yield Bu. Corn Per Acre
Anhydrous Ammonia...	4 in.	15.4
Ammonium Nitrate....	4 in.	13.7
Ammonium Nitrate....	Surface	12.8

Anhydrous ammonia was slightly superior to ammonium nitrate, and a 4-inch depth of application of ammonium nitrate was slightly superior to depth application. In five tests ammonium nitrate made the same increase in yield when applied before planting as when applied as a sidedressing. Anhydrous ammonia made slightly more corn when used as a sidedressing than when applied before planting; however, the difference is not significant. The 6-inch depth of application of ammonia produced one bushel more corn than the 4-inch depth of application in eight tests.

(To be continued in next issue)

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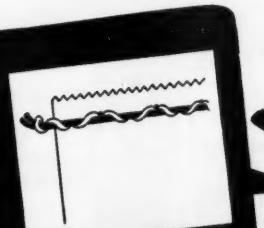

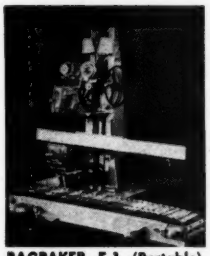

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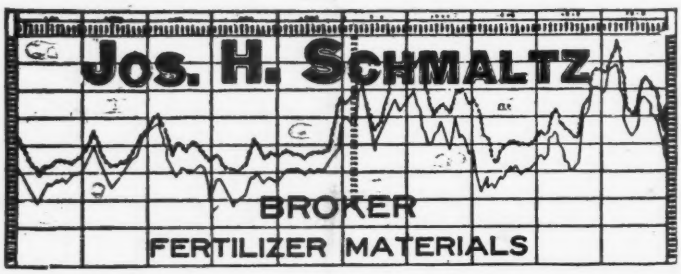

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